# A: Datasheet

Algorithm: qnap_002

Developer: Qnap Security

Submission Date: 2022_04_15

Template size: 2048 bytes

Template time (2.5 percentile): 821 msec

Template time (median): 823 msec

Template time (97.5 percentile): 858 msec

Investigation:

Frontal mugshot ranking 151 (out of 345) –– FNIR(1600000, 0, 1) = 0.0049  vs. lowest 0.0008 from sensetime_007

Mugshot webcam ranking 148 (out of 307) –– FNIR(1600000, 0, 1) = 0.0211  vs. lowest 0.0056 from sensetime_007

Mugshot profile ranking 48 (out of 276) –– FNIR(1600000, 0, 1) = 0.1723  vs. lowest 0.0521 from sensetime_007

Immigration visa–border ranking 76 (out of 234) –– FNIR(1600000, 0, 1) = 0.0041  vs. lowest 0.0008 from sensetime_007

Immigration visa–kiosk ranking 109 (out of 231) –– FNIR(1600000, 0, 1) = 0.1251  vs. lowest 0.0487 from cubox_000

Identification:

Frontal mugshot ranking 103 (out of 345) –– FNIR(1600000, T, L+1) = 0.0264, FPIR=0.001000  vs. lowest 0.0014 from sensetime_007
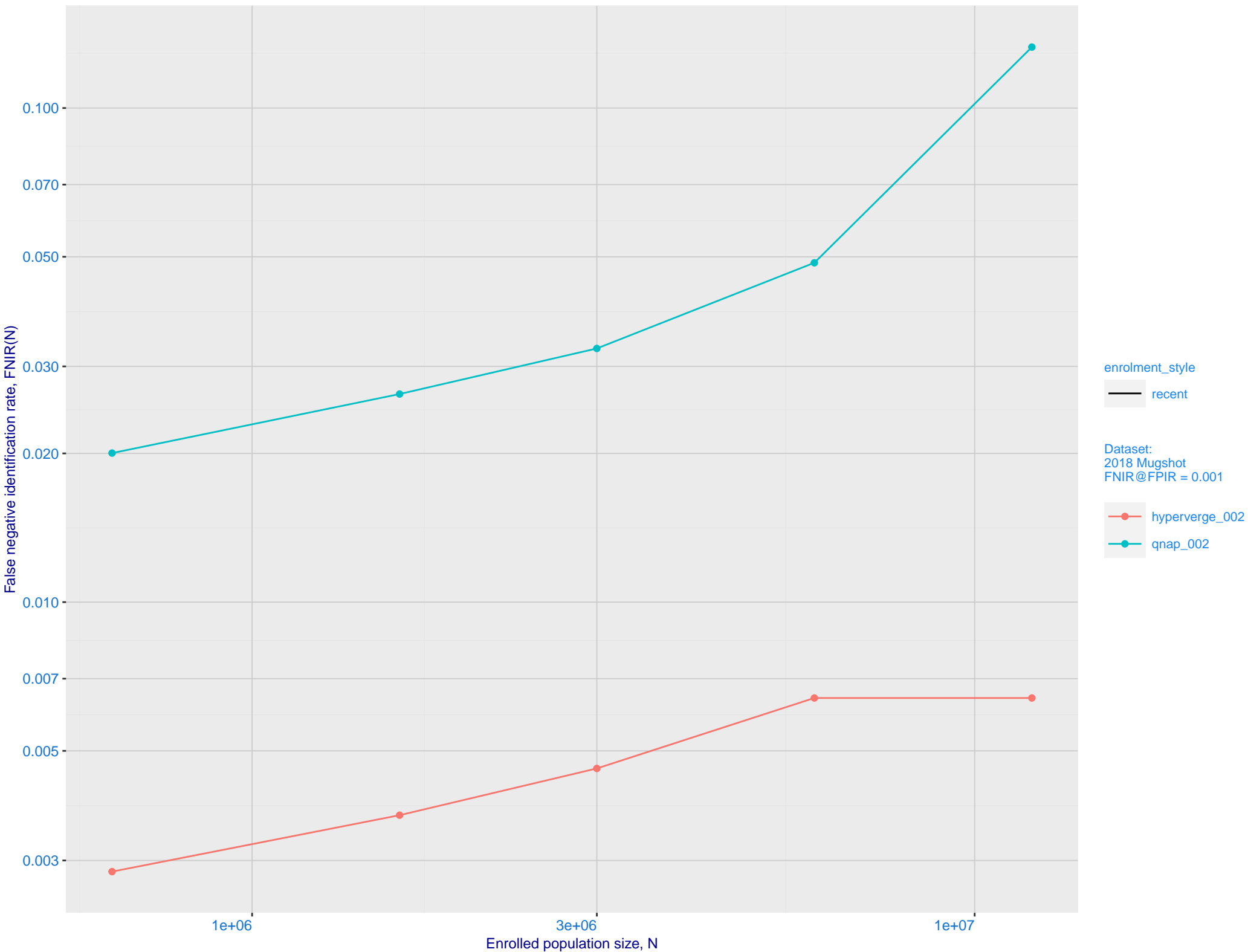
Mugshot webcam ranking 138 (out of 305) –– FNIR(1600000, T, L+1) = 0.1056, FPIR=0.001000  vs. lowest 0.0093 from sensetime_007

Mugshot profile ranking 46 (out of 275) –– FNIR(1600000, T, L+1) = 0.7721, FPIR=0.001000  vs. lowest 0.1093 from cloudwalk_mt_000
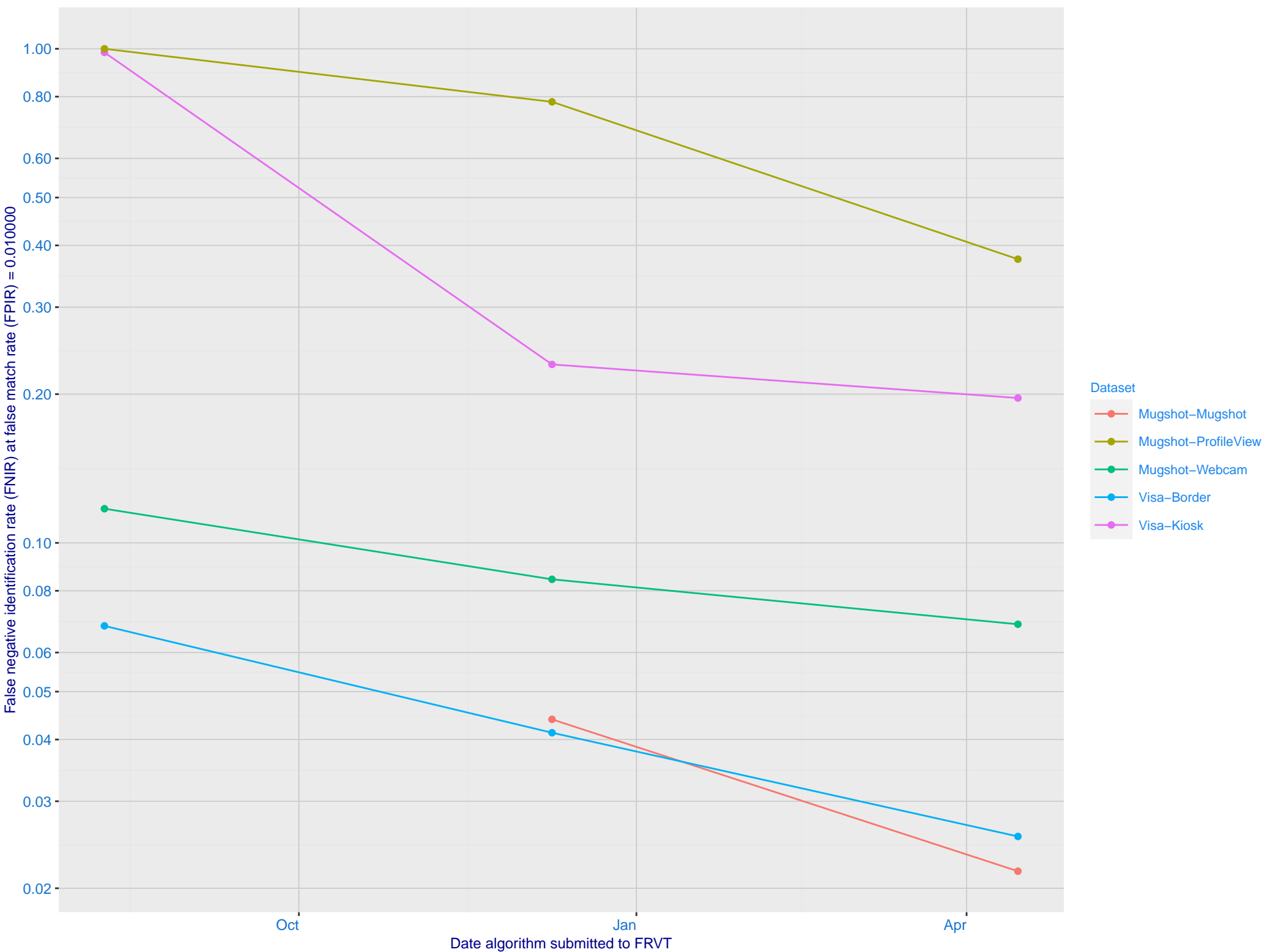
Immigration visa–border ranking 110 (out of 233) –– FNIR(1600000, T, L+1) = 0.0519, FPIR=0.001000  vs. lowest 0.0024 from cloudwalk_mt_000

Immigration visa–kiosk ranking 82 (out of 228) –– FNIR(1600000, T, L+1) = 0.2781, FPIR=0.001000  vs. lowest 0.0719 from cloudwalk_mt_000
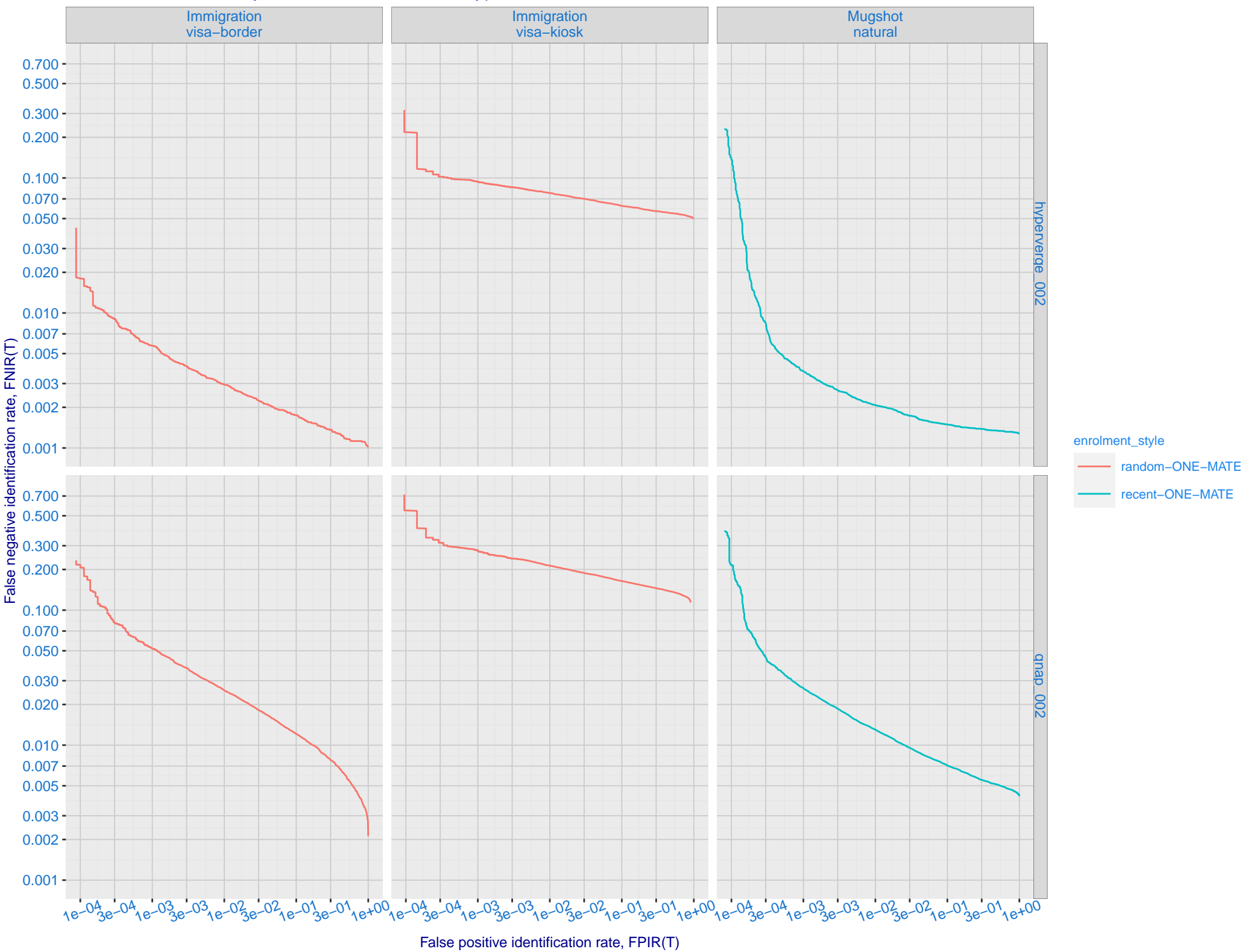
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (hyperverge_002)

**C: Evolution of accuracy for QNAP algorithms on three datasets 2018 – present**

False negative identification rate (FNIR) at false match rate (FPIR) = 0.010000

Date algorithm submitted to FRVT

Dataset
- Mugshot–Mugshot
- Mugshot–ProfileView
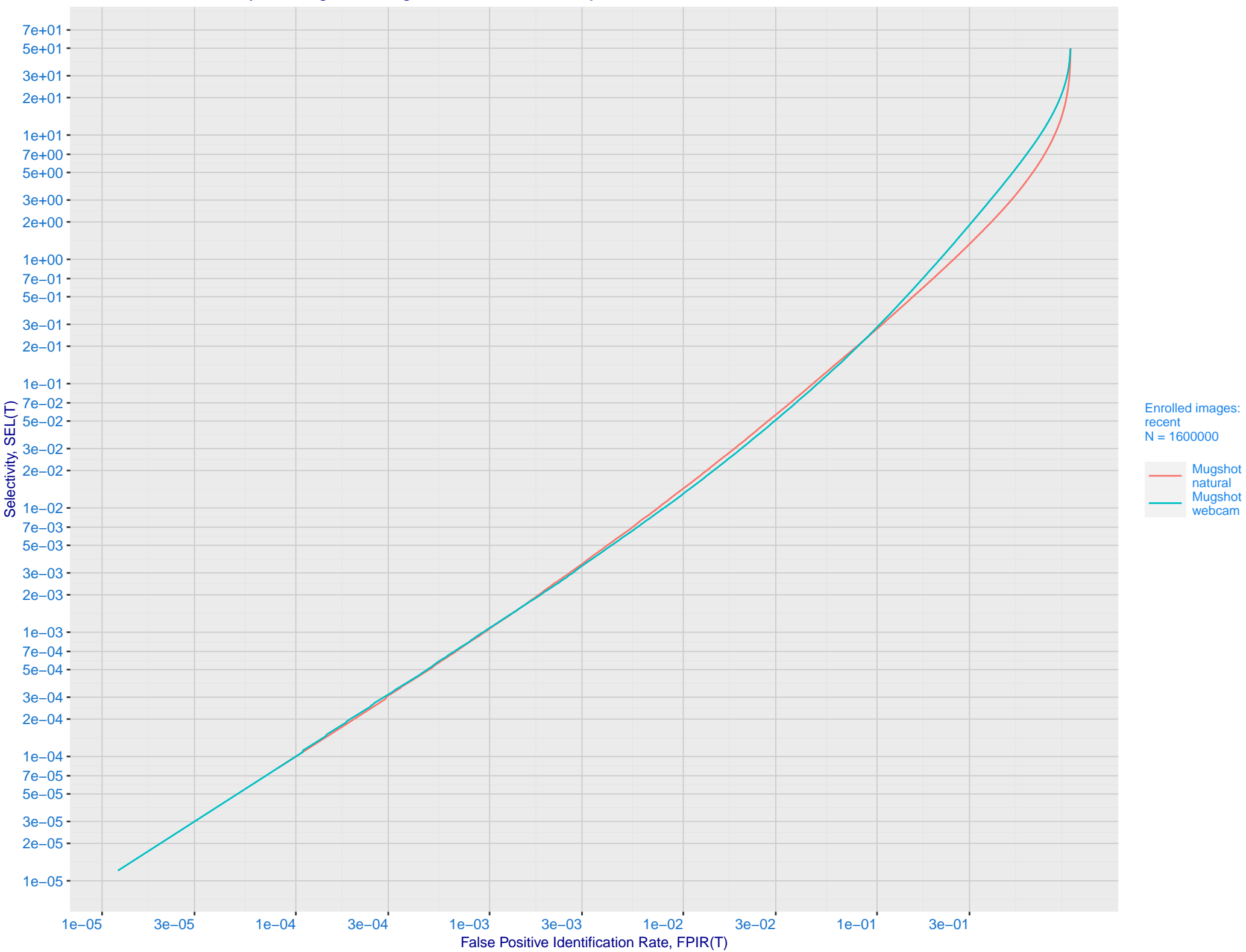- Mugshot–Webcam
- Visa–Border
- Visa–Kiosk

D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals

# E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images

N  —— 00640000  —— 01600000  —— 03000000  —— 06000000  —— 12000000
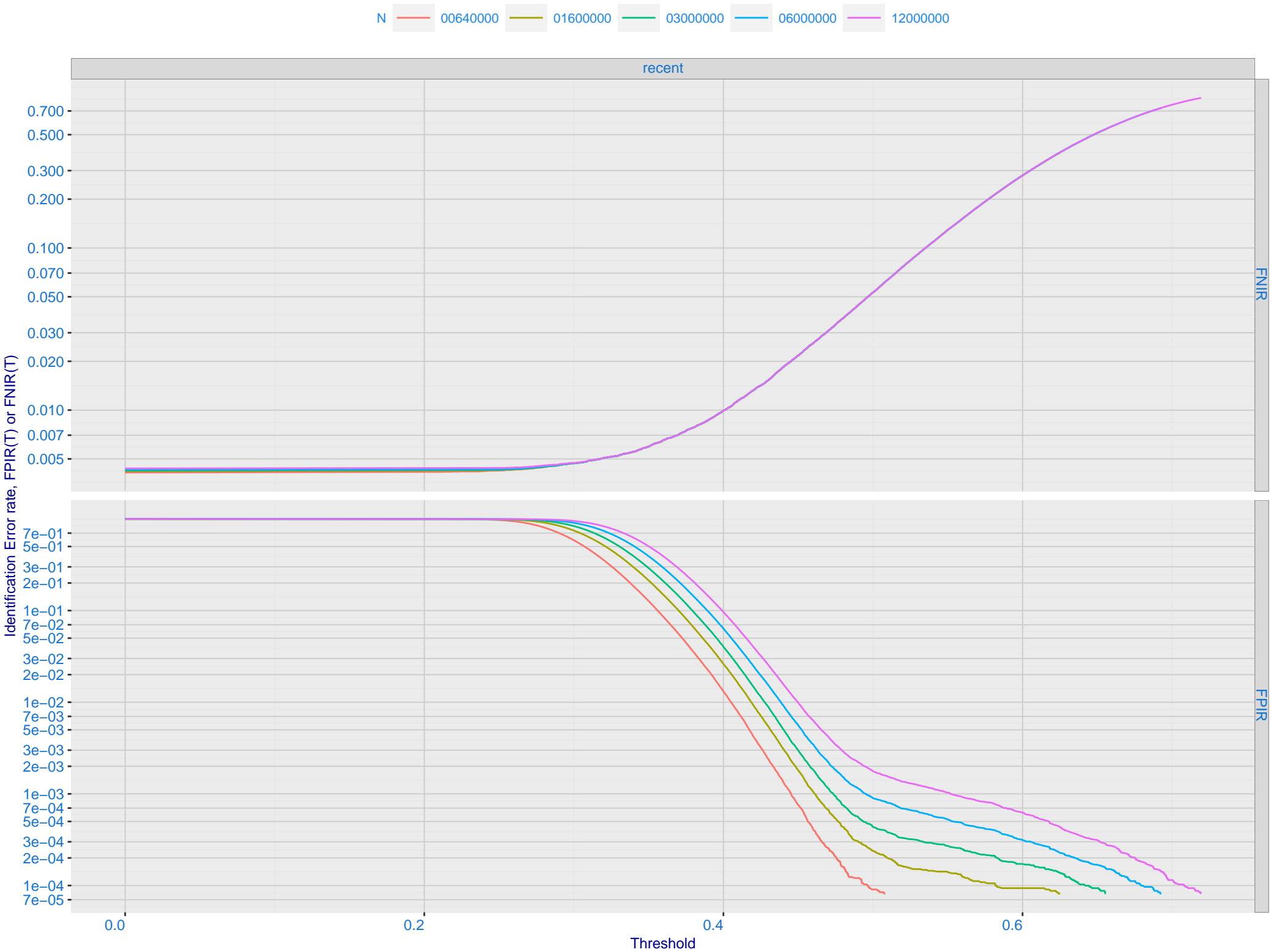
F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
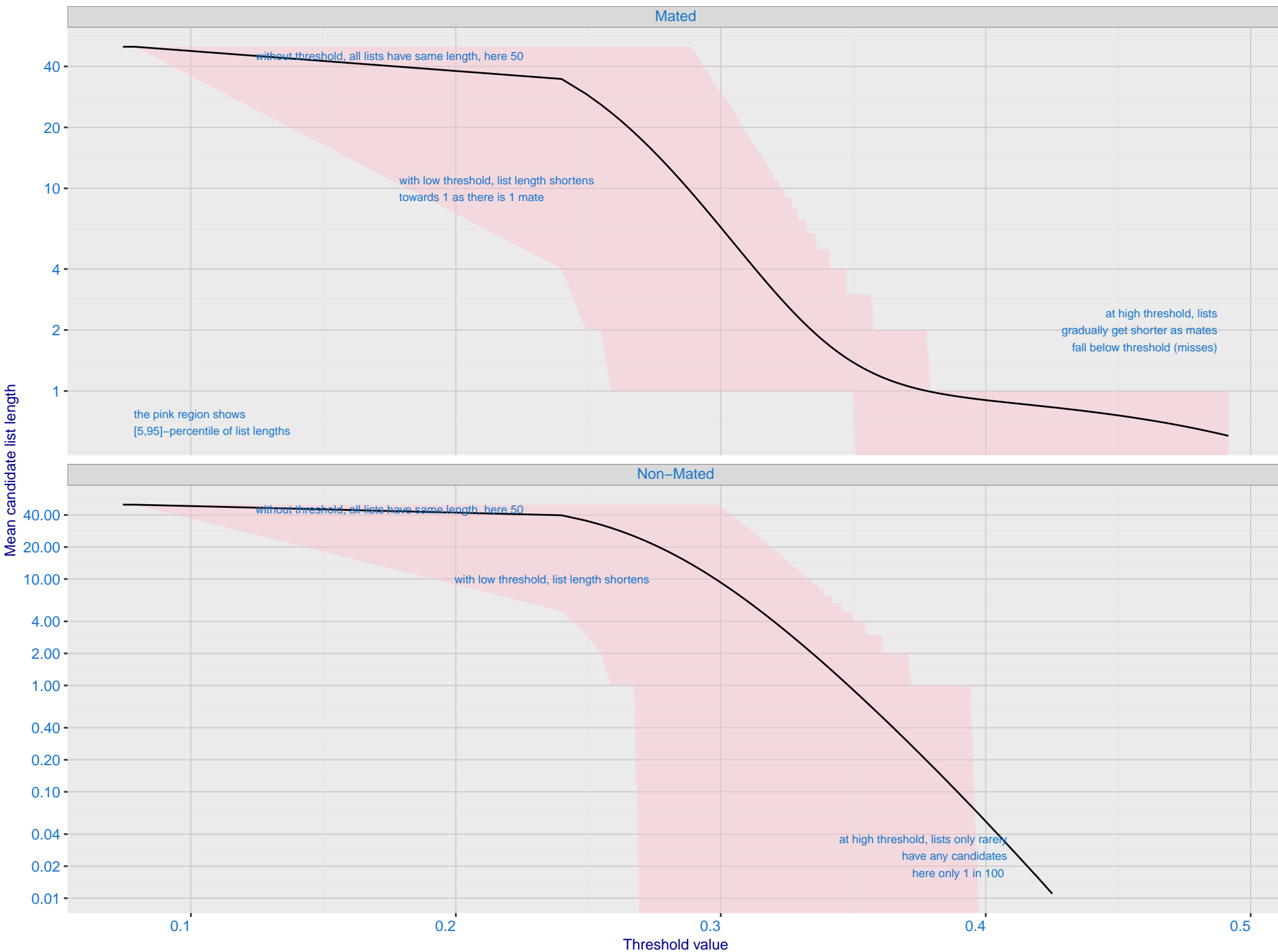
G: FPIR dependence on T by probe type for N = 1600000 subjects
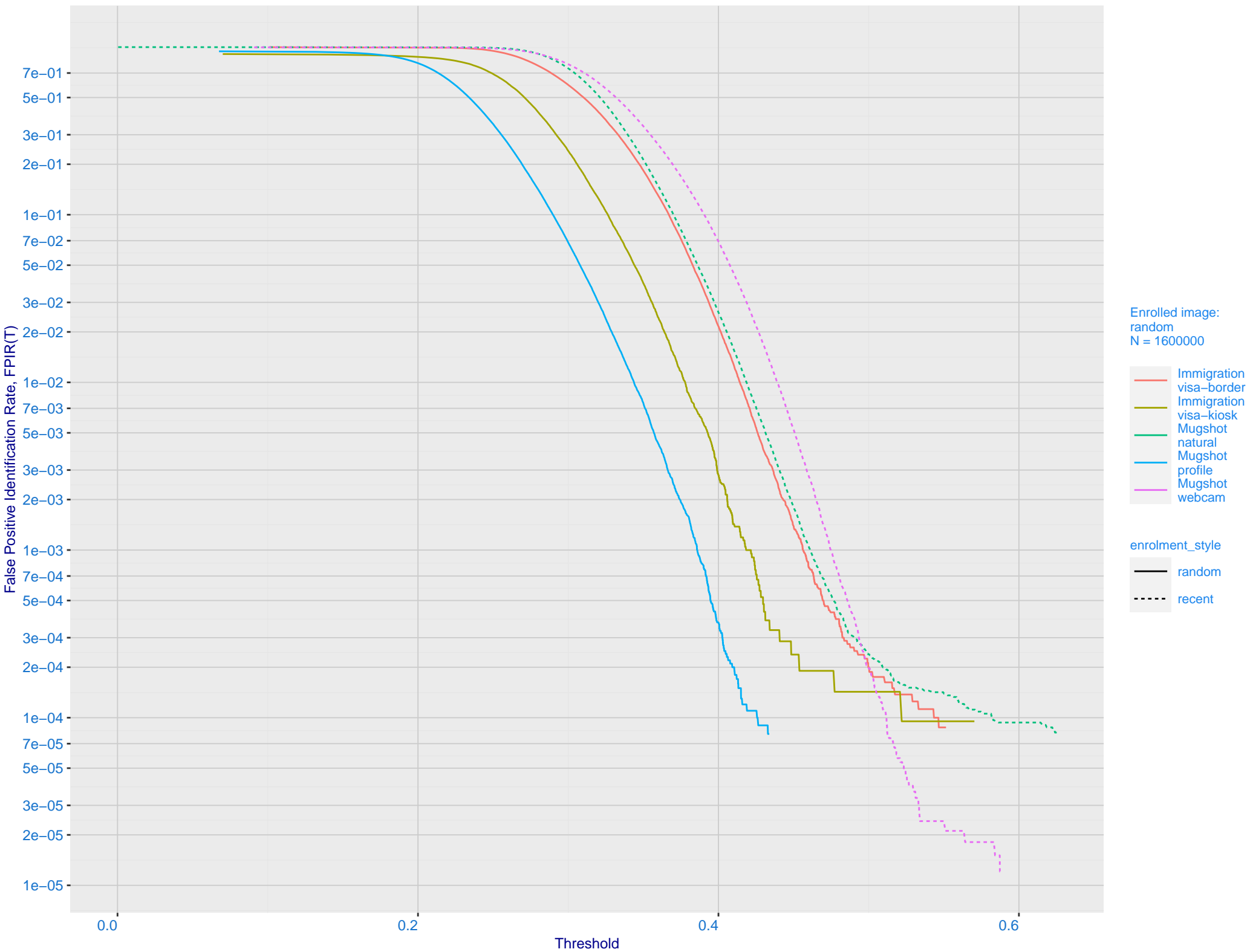
H: Reduced length candidate lists for human review
Dataset is border−border with time−lapse [10,15] YRS with N = 1600000. Probes are 10−15 years later than enrollment image

Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens
towards 1 as there is 1 mate

at high threshold, lists
gradually get shorter as mates
fall below threshold (misses)

the pink region shows
[5,95]−percentile of list lengths

Non−Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens

at high threshold, lists only rarely
have any candidates
here only 1 in 100

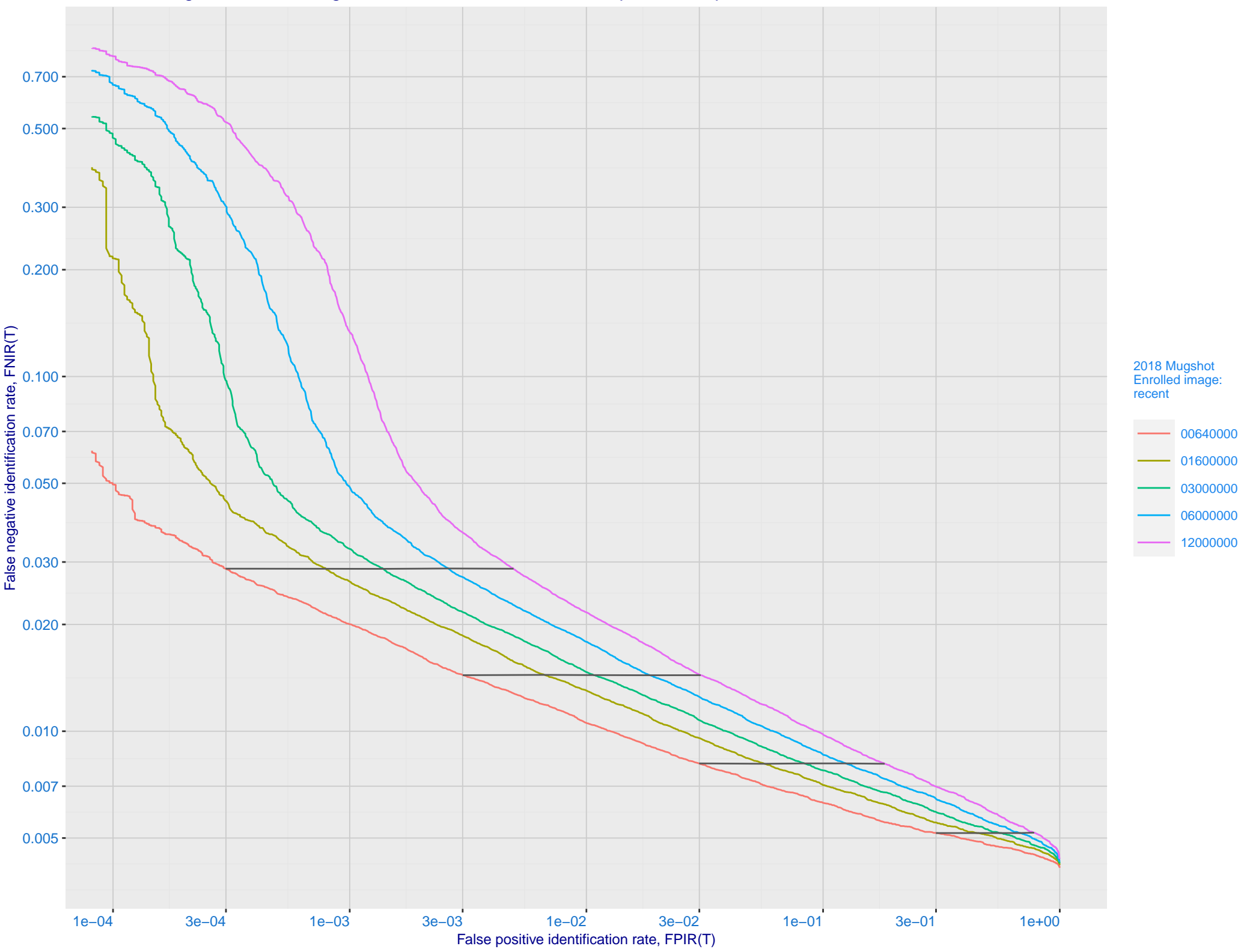Mean candidate list length

Threshold value
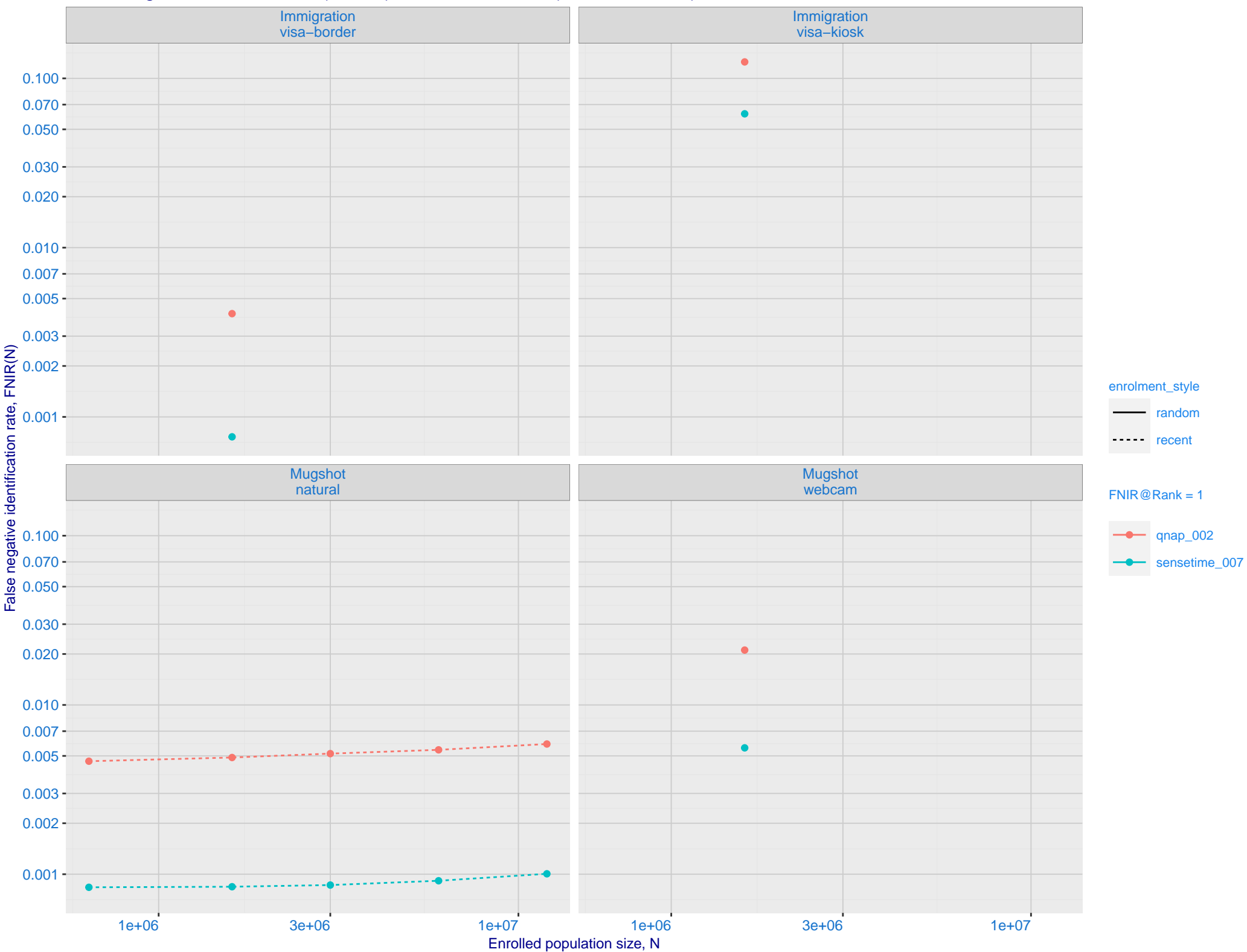
I: FNIR and FPIR dependence on threshold
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image
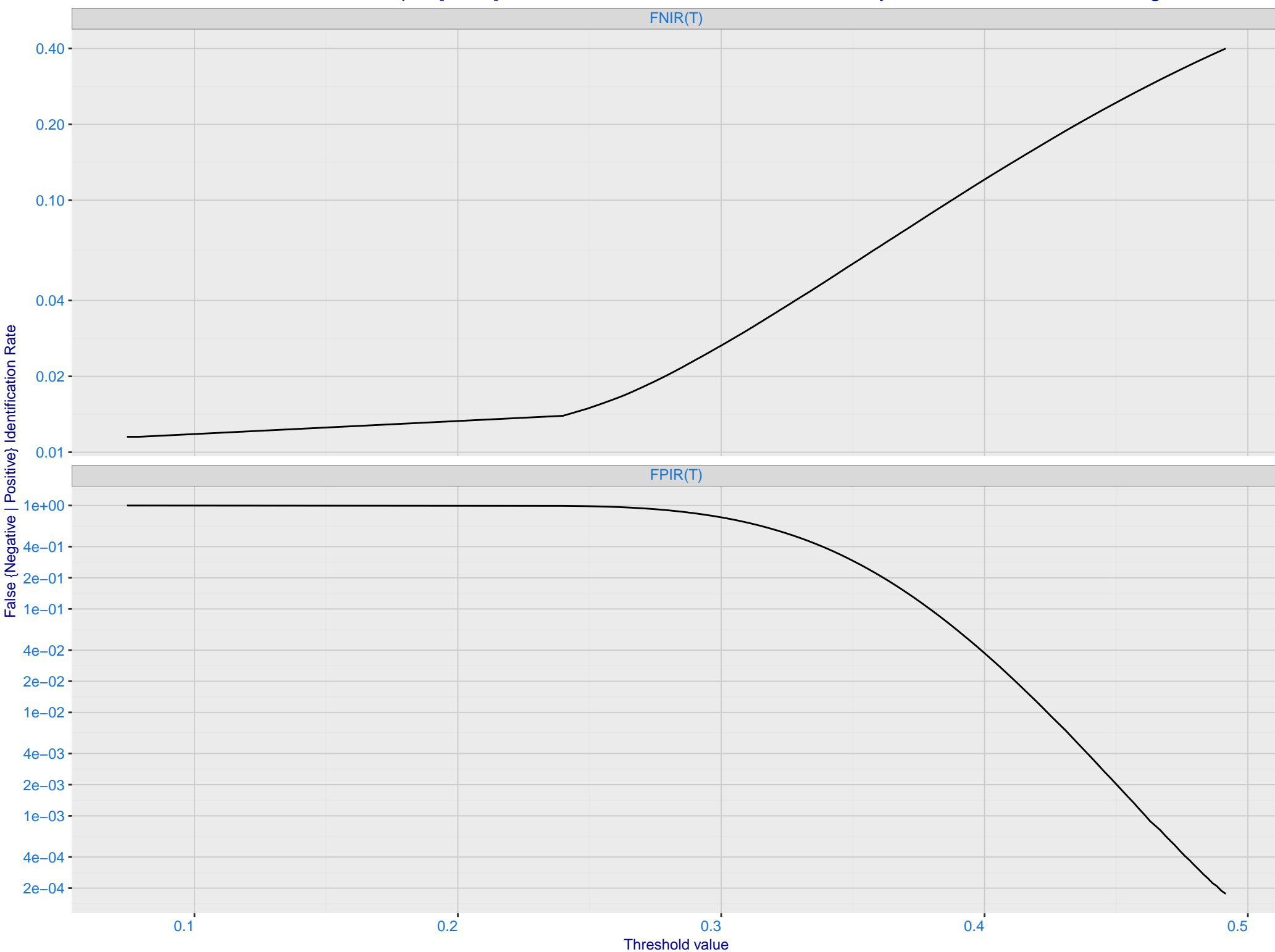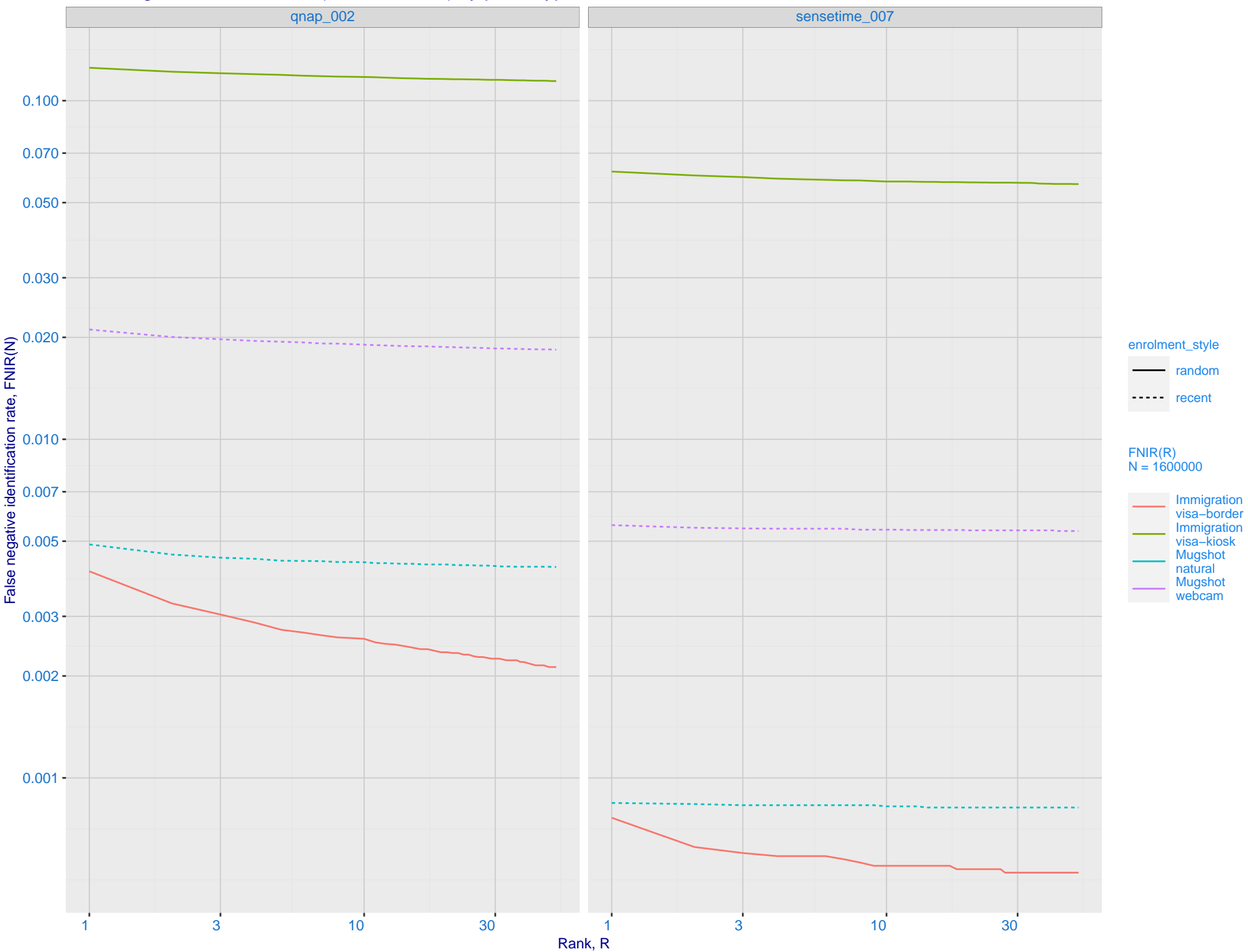
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.

K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_007)

L: Investigational mode: FNIR(1600000, R, 0) by probe type

M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power–law models are fit to the first two (N,T) observations
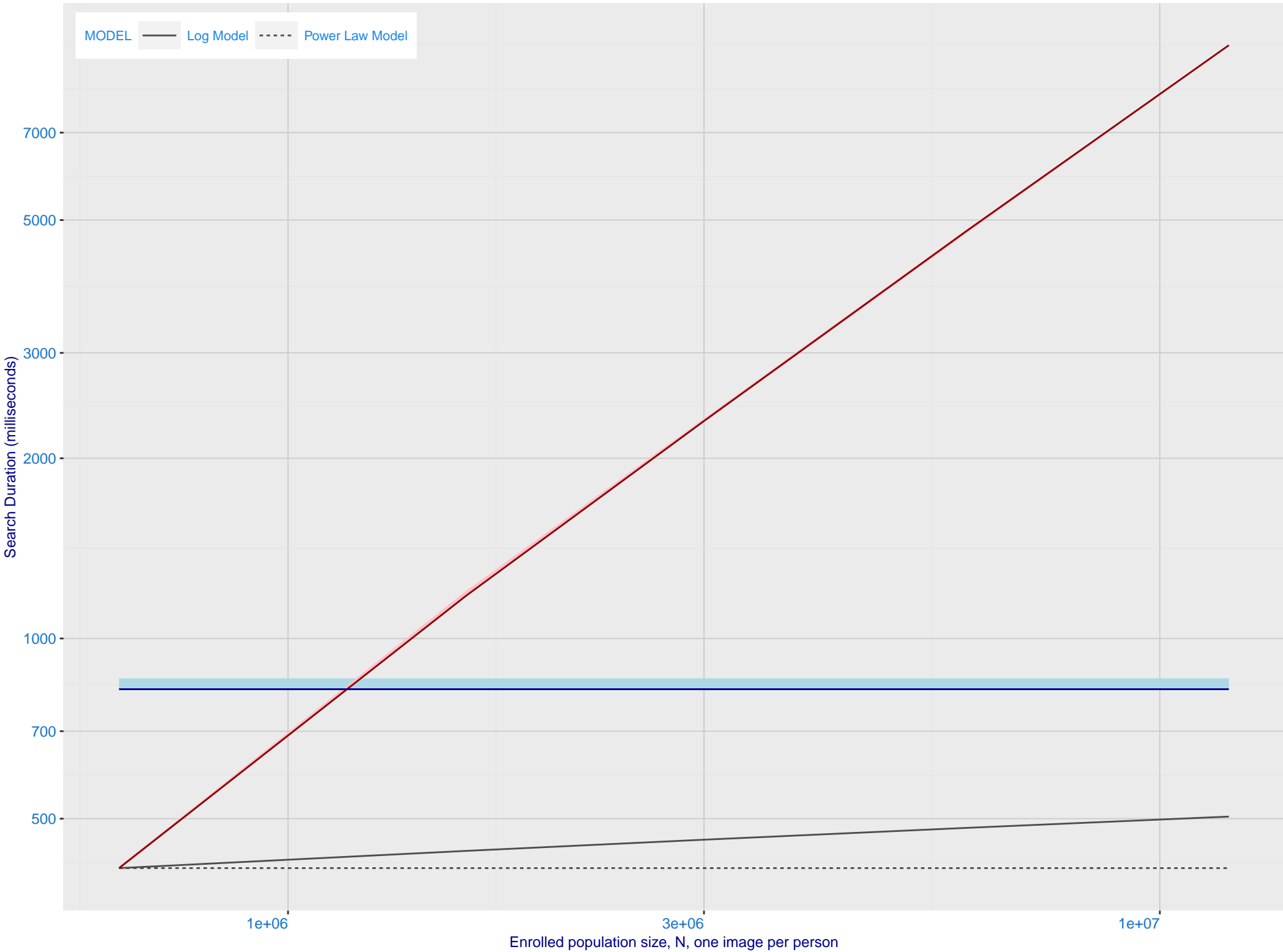
O: FNIR(T, N = 1.6 million) by sex, age and time–lapse. The top row gives investigational rank–1 miss rates. The bottom panels give high threshold for more lights–out identification with low FPIR.
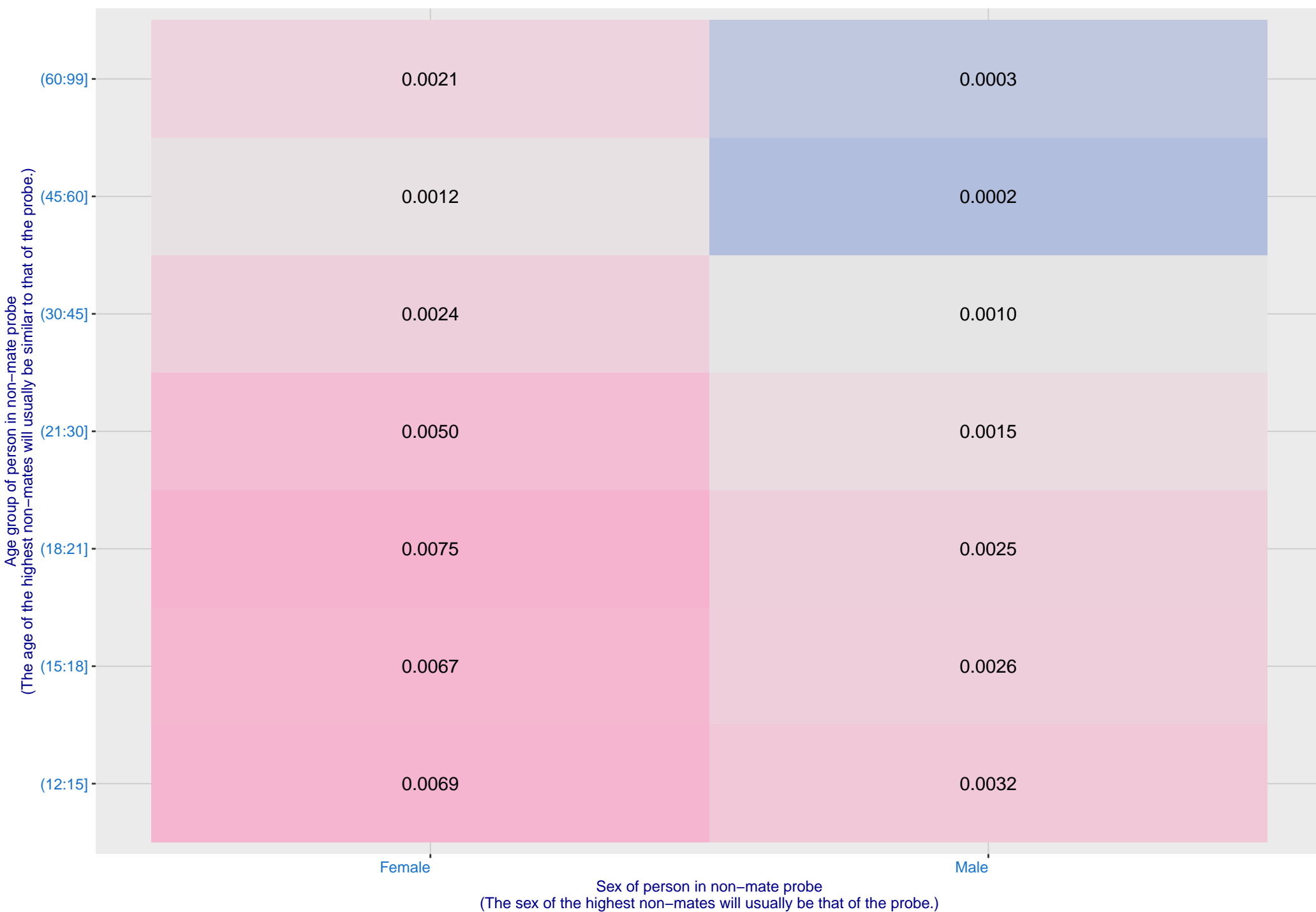
Algorithm: qnap_002, Dataset: Border–Crossing Ageing N = 1600000
Text encodes FNIR, Color encodes log(FNIR)
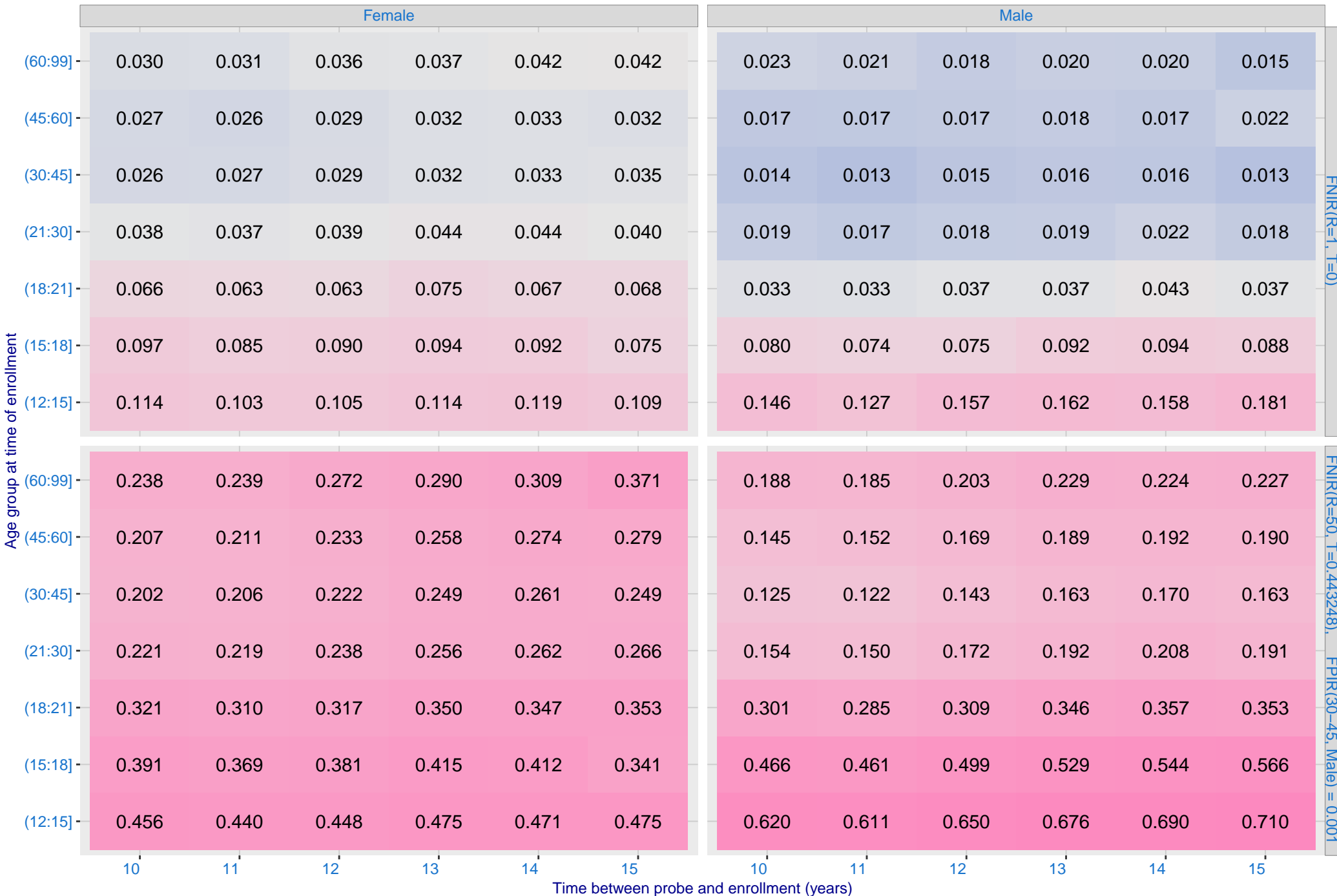
P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.

Algorithm: qnap_002, Dataset: Border−Crossing Ageing
Threshold: 0.443248 set to achive FPIR(30−45, Male) = 0.001

Color encodes log(FPIR)

−4    −3    −2    −1

Age group of person in non−mate probe
(The age of the highest non−mates will usually be similar to that of the probe.)

| Age group | Female | Male |
|---|---|---|
| (60:99] | 0.0021 | 0.0003 |
| (45:60] | 0.0012 | 0.0002 |
| (30:45] | 0.0024 | 0.0010 |
| (21:30] | 0.0050 | 0.0015 |
| (18:21] | 0.0075 | 0.0025 |
| (15:18] | 0.0067 | 0.0026 |
| (12:15] | 0.0069 | 0.0032 |

Sex of person in non−mate probe
(The sex of the highest non−mates will usually be that of the probe.)

Q: Identification FNIR(N, T, L+1) and Investigational FNIR(N, 0, R) under ageing